GEOGRAPHIC SCHOOL BULLETINS

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Contents for Week of November 23, 1942. Vol. XXI. No. 20.

1. U. S. Troops Open New Front in French North Africa
2. Coffee, Chief U. S. Hot Drink, Known to West Barely 300 Years
3. The Georgian Military Road—130 Miles of Scenery and Danger
4. New U. S. Bases in Fiji Islands Are Free of Many Tropic Ills
5. What Do You Know About Tanks?

U. S. Army Signal Corps

THE TANK, A BRITISH INVENTION, RIDES ON AN AMERICAN FOUNDATION

Benjamin Holt, brooding about farm equipment bogging down in the soft California soil, around 1900 invented the beltlike "caterpillar track" by which a vehicle lays down its own steel-linked track for its wheels to travel over. British engineers of World War I have credited to an American-made tractor being used in Belgium the idea of mounting tanks on tractor treads. In the light U. S. tank photographed, the front sprocket wheel turns the steel belt of about a hundred linked rubber-shod blocks, upon which the two pairs of wheels on each side can turn without sinking into mud (Bulletin No. 5).

HOW TEACHERS MAY OBTAIN THE BULLETINS

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U. S. Troops Open New Front in French North Africa

THEIR dramatic landings in French North Africa have placed United States and British troops on one hub of the war. They are in a position for a direct attack on the continent of Europe to the north across the Mediterranean, an attack from the rear on the hard-pressed Nazi forces in Italian Libia to the east, or a flank attack on the Vichy-controlled base of Dakar overlooking the South Atlantic.

Considered as a whole, the French northwest corner of Africa where the Americans have their new footholds consists of three political units, Morocco, Algeria, and Tunisia. Together, these members of the French Empire cover just over a million square miles, and within their boundaries live some 16,000,000 people, chiefly swarthy Arabs, Moors, and white Berbers of Moslem faith. They spread along roughly 1,250 miles of Mediterranean shoreline, while Morocco has a 600-mile front on the Atlantic.

Fertile "Island of the West" Between Sea and Sand

Their political ties with the mother country vary. Spacious, centrally situated Algeria, the largest of France's North African trio, is also the oldest under the French flag. It was claimed in 1834, although more than a decade of fighting followed before the hard-riding native warriors submitted to European rule. The northern part of the colony has been given representation in the French Chamber of Deputies as an integral part of France, while the sparsely settled desert portion to the south is under military rule.

Smaller Tunisia, lying to the east between Algeria and Italy's Libia, has been a protectorate of France since 1881, with its own bey, Sidi Ahmed, now in authority. Morocco on Africa's northwestern edge also is a protectorate, with Sultan Sidi Mohammed ruling as an absolute monarch under French guidance.

The Atlas Mountains, stretching diagonally across the three countries, are more closely related to Europe's ranges than to any African peaks, and geologists believe they were once a continuation of Spain's mountains before the Mediterranean pushed its way through the Strait of Gibraltar. Catching the rainfall and the cool breezes from both the Mediterranean and the Atlantic, the Atlas system makes a fertile northern arc curving across the three nations, well-watered in winter, temperate but dry in summer, with July temperatures averaging 80 degrees.

Desert-dwelling Arabs of the Sahara have named this fertile arc the "Island of the West," washed on west and north by ocean waves and on the south by drifting sand dunes.

Agriculture Flavors U. S. Larder

Although the bulk of the area is desert, the chief occupation of the three countries is agriculture. Even the United States, while selling them some sugar, looks to these North African lands for certain food items. Olive oil from Tunisia, paprika and sausage casings from Algeria, and food flavorings from Morocco appear on American import lists. Morocco sends cummin, coriander, and caraway seed, rosemary oil, apricot and orange pulp, as well as sausage casings. Algeria also exports quantities of cork—having a fourth of the Mediterranean region's cork forests—and brier root for pipes.

In return, the United States in 1940 shipped $750,000 worth of trucks and parts to Morocco, tractors and harvesting machines of comparable value to Algeria,

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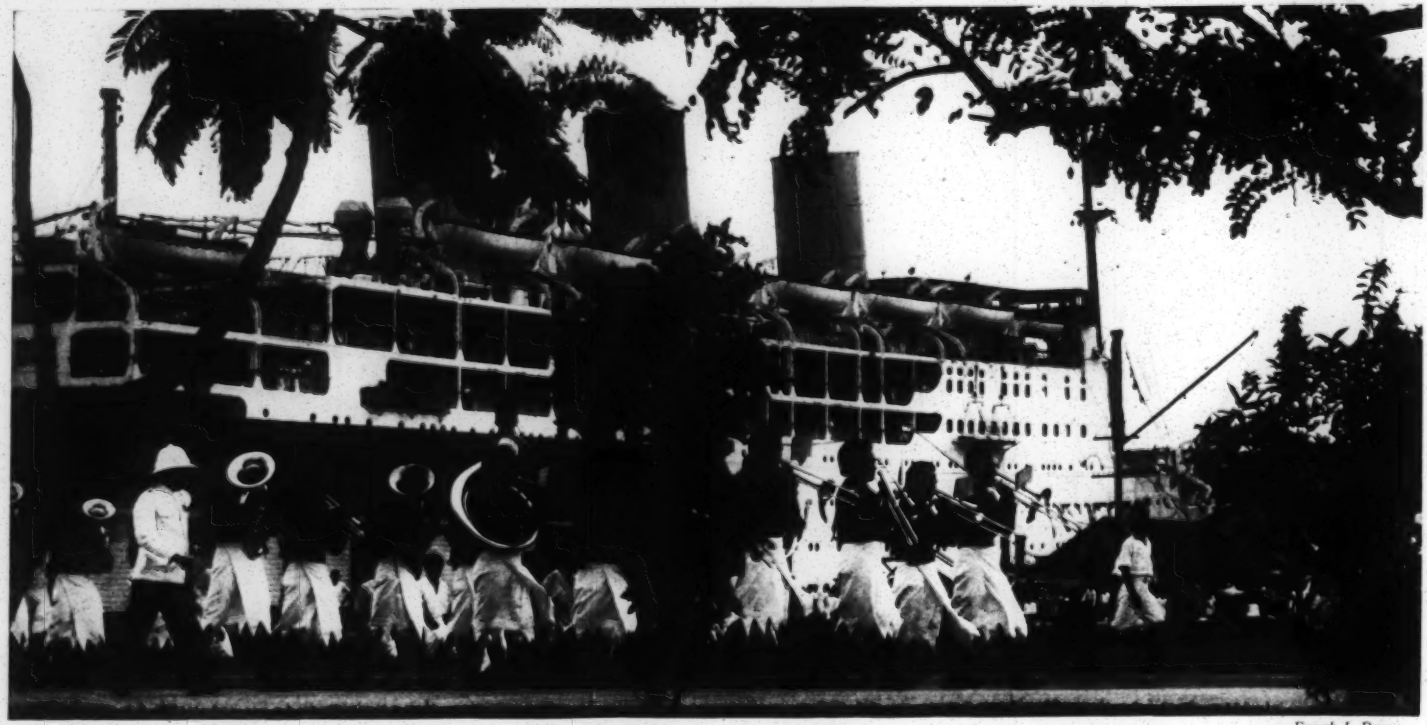

Frank I. Ryan

THE BRASS BAND IS A BOND BETWEEN MUSICAL FIJIANS AND VISITING VOYAGERS

A British colony, the Fiji Islands are a stop on the sea routes that bind Canada to Australia and New Zealand. Ocean vessels, in peacetime, stop weekly in the mountain-encircled harbor of Suva, the Fijian capital city of some 14,000 inhabitants, where a brass band welcomes visitors. The musicians' blue jackets and the fluttering points of their skirts, called *sulus* or *lava-lavas* instead of sarongs, are peculiar to Fijians on the police or government staff, but the straight, bushy hairdress is common to all Fiji men and women. A dark people chiefly of Melanesian blood, the Fijians preserve old folk songs telling how their ancestors migrated to the islands in long canoes. These musical people, before Europeans brought them the instruments for a brass band, often staged a *meke*, or song festival, in which large platoons of men and women would march and dance to the accompaniment of group singing on their village greens (Bulletin No. 4).

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Coffee, Chief U. S. Hot Drink, Known to West Barely 300 Years

THE rationing of coffee, an early effect of war in other non-tropical countries, is now making the war scarcity felt in the United States. It will drastically cut the 550 cups the average U. S. citizen has counted on each year.

The U. S. drinks more coffee than any other nation. Over two billion pounds a year in normal times (2,055,050,138 pounds in 1940) pours into U. S. ports, or about 20 times as many pounds as tea imports. This allows an average of thirteen pounds for each man, woman, and child. Since children rarely drink coffee, some adults obviously consume more than the statistical average. U. S. armed forces allot every man two ounces a day—approximately 2,000 cups a year.

Brazil's Production Could Supply World

More than 60 per cent of the coffee bought by the United States comes from a single country—Brazil. Almost three billion of the world's slightly over four billion trees sweep up the mountain slopes and spread along the valley floors of this one South American country. The prosperity of Brazil is firmly linked with the coffee market.

Second in world coffee production and exports is Colombia. The balance reaches the U. S. from the twelve other Latin American coffee producers, while a portion has arrived from Arabia, Africa, and the Netherlands Indies. A little, grown under the American flag, comes from Hawaii (illustration, next page).

Mexico supplies the United States with approximately 70 million pounds a year, less than a pound a year for each U. S. adult. Yet Mexico, with thousands of miles of railways and highways stabbing through the hearts of its coffee plantations, is the chief country from which coffee can be imported by rail.

Mocha in Arabia and Java in the Netherlands Indies are almost synonymous with coffee, although a mere fraction of America's supply came from those places. Coffee trees, however, were sent from Ethiopia to Arabia, from there to the Netherlands Indies, then to France, and from there to the Western Hemisphere. Brazil, now the largest producer in the world, planted its first coffee tree in 1727, but the crop did not attain commercial importance until the 19th century.

While rationing keeps U. S. coffee cups half empty, there is no shortage of coffee in the producing countries. Brazil alone can grow enough in a single year to supply the entire world for a year and two months. For the past several years Brazil's plantations yielded more coffee than customer nations could afford to buy, and coffee was burned by the ton, or dumped into the Atlantic. Part of this surplus today is being converted into plastics, for making everything from telephone receivers to instrument panels.

Early Coffee Sold by the Ounce in Pharmacies

The shortage of coffee, as of other foods, such as bananas, shipped over water, boils down to a shortage of shipping space. Ships are being sunk. Ships are being diverted from commerce to war duty. Steel is going into the ships to carry soldiers and war supplies and is not available for freighters to carry coffee.

The United States can raise coffee. In the 1920's the U. S. Department of Agriculture, testing the behavior of coffee trees, grew coffee in southern Florida and in certain spots along the southern California coast. But coffee, like rubber, has always been imported more cheaply than it could be produced in the less favor-

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and tractors to Tunisia. Such commerce is slowly changing the primitive agriculture of parts of the colonies (illustration, below). This corner of Africa has been farmed since the ancient days of Carthage.

Morocco, a Moslem stronghold for nearly 13 centuries, has its largest city on the Atlantic—Casablanca, with more than a quarter-million people. The capital, Rabat, is only a third as large. Inland Fez is the Sultan's home.

Algeria and its capital, Algiers, entered American history early, when the Barbary pirates made their headquarters in the latter city and demanded tribute of all ships sailing the Mediterranean. In 1795 the United States paid the pirates $992,000; three years later, four warships. Tired of this "shakedown," the U. S. Navy broke the power of the pirates in 1815.

Tunisia has special importance now because it is just across the Mediterranean from Italy, where Sicily narrows the sea to a strait.

Note: The French colonies in North Africa are shown on the National Geographic Society's Map of the Theater of War in Europe, Africa, and Western Asia. A price list of maps may be obtained from the Society's headquarters in Washington, D. C.

For further information on French North Africa, see the following articles in the *National Geographic Magazine:* "Time's Footprints in Tunisian Sands," March, 1937*; "Fez, Heart of Morocco," June, 1935; "The White City of Algiers," February, 1928; and "Across French and Spanish Morocco," March, 1925; and these GEOGRAPHIC SCHOOL BULLETINS: "French Northwest Africa Approaches Size of U. S.," May 4, 1942; and "France's North Africa Colonies Hold Vital Food and Minerals," April 7, 1941. *(Issues marked by an asterisk are included in the special list of National Geographic Magazines available to teachers at 10¢ each in groups of ten.)*

Bulletin No. 1, November 23, 1942.

From Willard Price

ARAB HORSE AND DESERT CAMEL PULL TOGETHER FOR MOROCCO'S HARVEST

In its more productive sections Morocco yields wheat, corn, and barley, with large crops of beans and other vegetables. Olive groves, lemon and orange groves dot the land, with numerous fig and almond trees. In Atlas highlands and on the grassy coastal plains, large herds of cattle graze, and sheep are more abundant than anywhere else in Africa except in the Union of South Africa. But south of the Atlas Mountains Morocco is less fertile, and the poor farms cannot support farm machinery. Here a horse and a camel are yoked to a primitive plow to turn the hard, dry soil. Many tribes inhabit the desert reaches, tending date groves and small gardens at the oases.

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The Georgian Military Road—130 Miles of Scenery and Danger

THE famous Georgian Military Road across Russia's Caucasus Mountains, for the northern entrance to which the Nazi forces are fighting, is more than 130 miles long, with scenic beauties and military threats in every mile.

It stretches from the city of Ordzhonikidze (formerly Vladikavkaz, which meant "Ruler of the Caucasus") to Tiflis, capital of the Soviet Republic of Georgia on the south side of the Caucasus Mountains in Transcaucasia. It is the only paved road suitable for motor traffic across the towering Caucasus range. The most practical alternate route is that beside the Caspian Sea miles farther east, where the mountains flatten out into a coastal corridor through the Derbent Gate.

Green Valleys and Desolate Grandeur

The Georgian Military Road begins in open rolling country at both ends, climbing gradually through the highlands to a central stretch of about 80 miles that crosses the range's crest through wild, majestic scenery.

Occasionally the road dips into green valleys past grain fields, climbs wooded hills, or cuts a rocky shelf across mountain flanks below which rush icy streams. Near the watershed of the Caucasus it winds between precipitous walls toward Daryal Pass, then higher to the Pass of the Cross, nearly 8,000 feet above sea level, beside which Mt. Kazbek towers 16,541 feet (illustration, next page).

Many of Kazbek's mountain neighbors—also visible from the highway—are tipped with the perpetual white of snow and glaciers. Others, so bare and sharp that snow will not cling, form a desolate chaos of red and brown pinnacles.

Along Daryal Gorge, the Georgian Military Road is caught between walls of sheer rock that rise for thousands of feet. Farther on, the road narrows still more as one side of it drops away to a river bed 600 feet below.

Strong Military Position

"A stronger military position can hardly be imagined," James Bryce wrote of Daryal Gorge in 1896. "For about a quarter of a mile the bottom of the gorge is filled by the foaming stream, so that it is only along the road that an army could advance. Half-a-dozen cannon could command the road, and a single explosion destroy it."

The Georgian Military Road was opened to carriage traffic in 1814. Previously it had been a narrow winding trail of ancient vintage. In today's war, military forces using the road would find the higher sections are cold at night, even in summer, and winter snows heavy enough to bar travel.

On the north, the road winds through the autonomous republic of Chechen-Ingushia, with villages of Ingush shepherds on the higher slopes. South of the crest of the range the inhabitants are Georgians. Their ancient name for Kazbek, Mkuinvari, meant "Ice Mountain," a tribute to the peak's eight mighty glaciers. Their famous Queen Tamara as well as later princes built castle-fortresses on its heights. Ancient Greeks believed Prometheus was chained there.

Note: The country traversed by the Georgian Military Road is shown on the National Geographic Society's Map of Europe and the Near East.

For further information about the Georgian Military Road, see "Roaming Russia's Caucasus," in the *National Geographic Magazine*, July, 1942; and "The Frosty Caucasus Wall, Russia's Mountain Rampart," in the GEOGRAPHIC SCHOOL BULLETINS, November 2, 1942.

UMI

able soils and climates of the U. S.

Coffee—or kahweh, as the Arabians first called it—has fallen into disgrace and risen to respectability many times since Mohammedans first borrowed it from Ethiopia to keep them awake during their long religious ceremonies. After its introduction into Cairo in the 16th century, it was forbidden as being highly intoxicating. Warehouses storing the "seditious berry" were burned. Later feeling swung so far the other way, in favor of coffee, that two Persian doctors were hanged for saying the drink was harmful.

The popularity of the coffeehouse spread from Constantinople, where the Mohammedans brought coffee from Arabia, to almost every corner of Europe. English tea drinkers opened their first coffeehouse in 1652, and when Charles II came into power London alone had some 3,000. Charles ordered them stamped out as centers of political agitation.

Coffee was first used as a paste rather than a beverage. Even when it came into general use it was sold only in pharmacies, by the ounce. During a smallpox epidemic in London, residents near coffee-roasting plants escaped the disease. Medical men claimed the "protective" fumes from the roasters were responsible, and coffee was then used as a disinfectant. It was—and is today—considered a heart stimulant.

Note: Areas which produce coffee are indicated on a large inset on the National Geographic Society's Map of South America. A price list of maps may be obtained from the Society's headquarters in Washington, D. C.

Bulletin No. 2, November 23, 1942.

Richard H. Stewart

CHRISTMAS WREATHS?—NO, A CHRISTMAS BREAKFAST DRINK

Clusters of red berries against shiny green leaves look like Christmas decorations—but the two smiling girls are helping harvest Hawaii's Kona coffee crop. Introduced in 1817, coffee can be grown in many parts of the Hawaiian Islands. It is raised commercially on the leeward coast of the Island of Hawaii, in Kona, where well-watered mountain slopes, up to 4,000 feet, produce superior fruit. Plantations, from 5 to 15 acres, are run by tenant farmers, or owners and their families, with extra harvest help—mostly Filipino. Wild coffee trees grow as tall as 25 feet, but commercial plants are kept below 10 feet. The evergreen leaves resemble laurel; blossoms are small, white, and fragrant, and the fruit is bright red, later turning purple. Coffee's flavor depends partly on whether it is picked early when green, later when red, or still later purple. The term "bean", often applied to the coffee berry, is from an Arabic word *bunn*, meaning coffee.

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New U. S. Bases in Fiji Islands Are Free of Many Tropic Ills

ANNOUNCEMENT that the United States has set up bases in the Fiji Islands, made in a U. S. Navy communiqué, may bring to readers' minds a number of widespread but incorrect ideas about the Fiji group. Hardiest of the fallacies about these tropical islands of the South Pacific, under British rule since 1874, is the notion that they are tiny, torrid, and terrifying.

In total area (7,083 square miles) the 240 Fijis exceed the Hawaiian Islands. In their sector of the Pacific they are outranked only by New Caledonia, the Solomons, the Bismarcks, and New Guinea. The largest of the group—Viti Levu, 75 miles long and 50 miles wide—is alone about half the size of the State of Massachusetts. The next in size, Vanua Levu, is 2,128 square miles in area. The 80 larger islands are inhabited, many of the others being reef-fringed coral atolls.

United States Clothing Comfortable in the Fijis

In spite of their situation well within the tropics, in the latitudes of Madagascar and sultry North Australia, the Fijis have a temperate climate. This is due to the relatively large size of the inhabited islands and to their mountains, which intercept clouds and currents of high, cool air. Tomanivi, also known as Mt. Victoria, in northern Viti Levu, is 4,341 feet high.

Temperatures in the islands seldom top 90 degrees Fahrenheit, rarely go below 63 degrees. It is the December-to-April summer that brings the higher temperatures, on hot north winds from the Equator. Clothing that Americans would wear in the U. S. in summer is comfortable in the Fijis. White people thrive there, and outdoor sports addicts are not discouraged by excessive heat. Malaria is absent, although mosquitoes are found there.

Luxuriant vegetation clothes valleys, hills, and mountains, especially on the windward slopes where the clouds lose most of their rain. Rainfall is heavy, especially from December to April when hot north winds blow. The rain at Suva, the capital, averages about 120 inches a year.

Panama Canal Put the Fijis on England-Australia Route

At the war's outbreak, the population of the Fijis included about 4,000 Europeans, 101,000 natives, and 92,000 East Indians brought to the islands for work on sugar plantations.

Sugar cane is the leading crop, sugar being exported to England and Canada. Culture of rubber trees, bananas, cotton, and rice has been encouraged. The islands' possibilities as cotton producers lured settlers there when the U. S. Civil War caused a cotton shortage and hastened annexation of the Fijis by Britain.

Industrial plants in operation in normal times included sugar mills, rice mills, cotton gins, copra dryers, sawmills, and a biscuit bakery.

The trade in copra was second only to the sugar business before the war, and now may be exceeding it because of the war-born demand for glycerine made from copra's oil. Raising and gathering coconuts for copra is an old industry in the islands, still mainly in the hands of the Fijians themselves.

Roads are few in the Fijis. Boats and launches have provided most of the local transportation. The opening of the Panama Canal gave the islands a lift toward prosperity, putting them on the England-Australia-New Zealand sea route.

The harbor at Suva, about two miles square, attracted enough commerce to

Sovfoto

PAST INGUSH SHEPHERDS AND RUINED GEORGIAN CASTLES, THE GEORGIAN ROAD CLIMBS OVER A SHOULDER OF SAW-TOOTHED MOUNT KAZBEK

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What Do You Know about Tanks?

THE iron tip of the British spearhead that broke the Nazi lines in western Egypt, pitching the Axis forces backward in retreat, was composed of tanks. From its entry into the English language until 1916, "tank" meant simply a receptacle for liquids, but how it came to describe one of the deadliest weapons of modern warfare is a curious story, brief and increasingly grim.

The name "tank" was used during two years of experiment for England's World War I secret weapon because it was *not* a tank, so that the word would betray no hint of its real nature. Built as naval projects and named like ships, these land-battleships were designed to be crawling fortresses, defying the German machine guns by which massed infantry attacks were stopped dead.

Two-Ton Midgets and 100-Ton Monsters in Tank Family

The first tanks to engage in battle were the 49 pioneers that rumbled into the Battle of the Somme on September 15, 1916. The historic tank triumph of World War I was at Cambrai, on November 20, 1917, when nearly 380 of Britain's lumbering metal monsters together lunged forward to win a 10-mile advance in a single day, though smaller gains had previously required months. Since then, with variations from 2-ton British vest-pocket tankettes to the modern Russian 100-ton leviathan with a 10-man crew, the tank forces of "iron cavalry" have revolutionized ground fighting.

Though secretly concocted by the British, the tank is the product of centuries of experiment. It could not have been developed without the earlier invention of the gasoline engine and other internal-combustion motors, and the ground-gripping, track-laying tread already used on U. S. farm tractors (illustration, cover).

Knights in Armor Foreshadowed Tanks

The basic idea of giving armored protection to fighting men is as old as warfare, going back to early Greek and Roman armor and to the mailclad knights and armored horses of the Middle Ages. In ages B. C., when working their battering rams against a walled city, besiegers often protected themselves from javelins and arrows by movable sheds called penthouses, which sometimes were fortified by iron plates. Ancient Romans used siege towers to protect forces assaulting a wall. Made of wood and often plated with iron, mounted on wheels, the tower was manned with soldiers at different levels and pushed against the wall.

With its turning turret, the modern tank acknowledges its kinship to the *Monitor* of the United States Navy's first clash of ironclad ships. The tank's armor must give credit to the *Monitor's* adversary, the *Merrimac*, though ship armor may be traced back at least a thousand years to the round shields of the Vikings hung on the gunwales.

Today's members of the United States Army's tank family might be terrifying creatures in a fable of prehistoric giants represented as Baby Turtle, Mamma Turtle, and Papa Turtle. Like turtles they have humped armored shells, sometimes steel two inches thick, with their means of locomotion exposed along the lower edges. The baby of the Iron Shell family is a speedy 15-ton infant carrying a 37-mm cannon on its back. The medium-size monster, weighing 28 or 30 tons, has a 37-mm cannon on its right shoulder and a 75-mm cannon on top. The heaviest U. S. tank, a 57-ton mastodon bristling with machine guns, packs a 3-inch cannon and a little 37-mm one for good measure. New gun turrets can swing in

UMI

build the capital town up to a population of about 14,000 (illustration, inside cover). Suva is the main station of the Pacific cable linking Canada and Australia, and a port of call for mail steamers from Vancouver to Sydney. Suva is fairly modern, with a waterworks, electric lights, telephones, and concrete buildings.

Fijians of the old order were born with a blood thirst. They were especially hostile to foreigners, after contracting new diseases from them, and made a practice of killing any stranger setting foot on their shores. They made a career of cannibalism, outdid all their fellow practitioners in the South Seas, and earned a ferocious reputation. Relatives and companions were likely to appear on the meat course. Missionary influence, more peaceful government, and more plentiful food gradually changed jungle appetites. The entire population took to Christian ways, originally introduced by Tonga Island natives. Current editions of the islanders are mild-mannered, courteous, and kindly.

Note: The Fiji Islands are shown on a large-scale inset on the National Geographic Society's Map of the Pacific Ocean.

For further information about the Fiji Islands, see "Treasure Islands of Australasia," in the *National Geographic Magazine*, June, 1942.

Bulletin No. 4, November 23, 1942.

Harry Pidgeon

MBENGHA GIRLS HAVE WOODEN SKIRTS AND GRASS HOUSES

Many a woman's *sulu*, or sarong, is made of tapa cloth, of pounded bark painted in bright stenciled designs, which Fijians used before cotton was introduced. Over the *sulu* for public appearances the Fiji girl wears a cotton tunic. Although fine timber is plentiful, natives use little of it because they lack carpenter's tools. They build houses with rooftree and corner posts of breadfruit timber, rafters of bamboo; roof, walls, and floor are a grassy thatch of reeds on a foundation of mats plaited from pandanus leaves. Lacking nails, they tie houses together with pandanus fiber, stained black for a decorative pattern. The Fiji girls and their waterside haystack home were photographed on Mbengha, near Viti Levu.

any direction. The three types all have tractor treads, with two, three, and four pairs of wheels on each side in accord with their respective sizes. Steered with brake-levers rather than a wheel, the track on either side can be operated separately.

A separate section in the rear of the tank shelters the motor, which in most cases is a radial air-cooled engine like an airplane's. There also is the ventilating unit, to push air into the hot, breathless interior. Although within inches of one another, members of the tank crew in action address one another by telephone, since the boiler-factory noise would drown out their natural voices. Radio keeps the tank in touch with other tanks crawling along on the same maneuver.

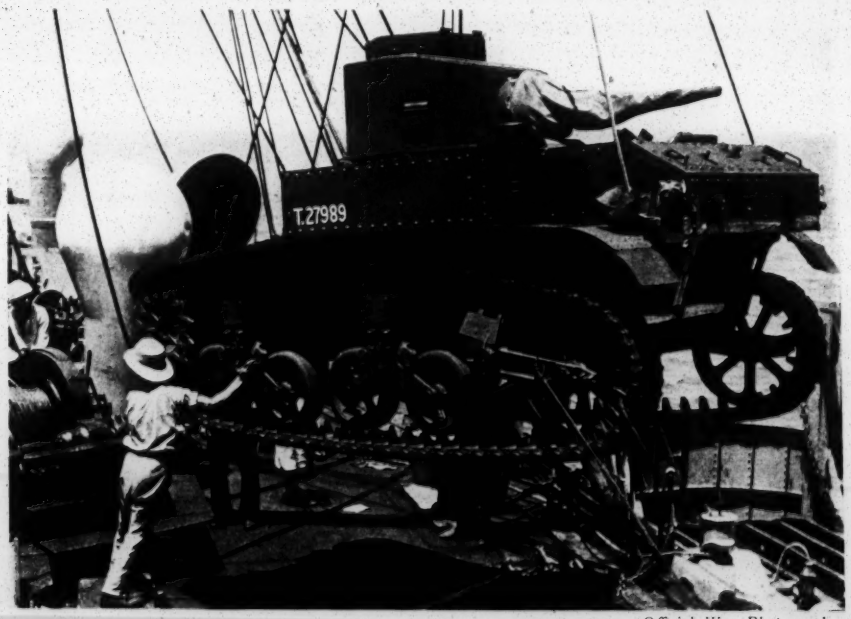
The commander rides up in the turret, which revolves and permits him to see in all directions. He directs the driver, who can see only straight ahead, to turn by telephoning or by kicking him on the shoulders.

Tank soldiers find that they are helped by such high school studies as mathematics for their gunnery and physics for radio and engine mechanics.

A tank is one of the big consumers of the metals gathered in scrap drives. In addition to steel (72,000 pounds in a medium tank), it needs much aluminum for engine parts, copper for wiring, brass for tubes and pipes.

Note: For further information about Uncle Sam's tank forces, see "Around the Clock with Your Soldier Boy," in the *National Geographic Magazine*, July, 1941*. (*Issues marked by an asterisk are included in the special list of National Geographic Magazines available at 10¢ each in groups of 10.*)

Bulletin No. 5, November 23, 1942.



Official War Photograph

A YANK TANK LANDS IN EGYPT FOR DESERT WARFARE

While tanks were still in the secret experimental stage during World War I, the British hinted that the "Tank Department" was working on something new to carry water for troops in Egypt. The invention turned out to be not a water-carrier but a miniature armored fortress carrying men and guns. The first tank weighed 28 tons at birth; smaller editions of the battle-buggy appeared later. The British have nicknamed American tanks after Civil War generals; this type, a light tank, is the General Stuart. It has a 37-mm cannon up its sleeve as well as an assortment of machine guns. Its greatest weapon, however, is its speed. The endless belt of the tractor tread is moved by the sprocket wheel in front; the large smooth wheel in the rear is an "idler." The rivets in turret and hull of this type, if hit by shellfire, sometimes shot inward and wounded the crew; later types are welded or cast, with few crevices or joints.

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